the introduction properly, but probably some incident in her life that must be approached by psycho-analytic methods. I believe that psycho-analytic treatment promises worthy results in these cases.

DR. TRUMAN W. BROPHY, Chicago: It seems to me that our duty lies in the direction of doing all we can to place persons who are thus afflicted in the hands of those who are eminently prepared to correct the defect. Other defects, aside from stammering come into our experiences in the management of those who are not able to speak distinctly. For a long time I have been trying to help these persons by directing them to experts in phonation. Such teachers as Dr. Kenyon, Dr. Hudson-Makuen of Philadelphia, Dr. Scripture of New York and Mrs. Reed of Detroit are able to do so much to assist those afflicted in this way, help them out of their difficulties and put them in a position to go through life as others do, that I feel that we should recommend these persons to them for treatment.

DR. A. T. RASMUSSEN, La Crosse, Wis.: I devote a good deal of time to the practice of facial orthopedia, commonly known as orthodontia. A case comes to my mind of a bright boy, 15 years old, whose parents brought him to me stating that he stuttered, and asking that, if possible, I find a reason for it. They said that he stuttered seldom, but that when he did, it was very bad. There seemed nothing wrong about the boy's condition except some slight oral defects. I performed an oral operation, correcting a slightly undeveloped maxilla, and gave the boy a great many suggestions. He does not stammer now. Whether it was altogether the suggestion, or whether it was the treatment, or whether it was a combination of the two, I am not prepared to say, but I think that we should take into consideration the possibility of this defect being due to some pathologic condition in the mouth.

MRS. FRANK REED, Detroit: I think that the gentleman who has just spoken has made it quite clear to us that any physical defects which are present should be corrected, and that possibly such correction would give the child a suggestion that he can talk all right when he has learned the process of speech.

DR. H. F. MCBEATH, Milwaukee, Wis.: Dr. Kenyon and Mrs. Reed have made clear to you the disadvantages to the individual stammerer, and Dr. Brophy makes the suggestion that they be sent to eminently able people for correction. Knowing the number of stammerers in this country, we see that but a small fraction can be handled by the few who are capable of doing the work. What is needed by the schools is an outline of the principles which should be followed so that the teachers shall not be permitted to continue experimenting. In twenty-six cities in the United States the number of stammerers in the schools is not even known. In twelve cities the schools are attempting to do this work and are getting good results through their special teachers.

Nearly all of the school superintendents from different parts of the country in answering my questionnaire express themselves as seeing the need in the near future of establishing a department for the stammerer. It seems to me that the American Medical Association might outline a superior method which would be a great help to these educators.

Underweight Schoolchildren.—In one of the public schools in Philadelphia, Walter W. Roach found that ten pupils between 6 and 7 years of age were 62 pounds underweight, or an average 6 1/5 pounds per child; eighteen pupils between 7 and 8 years were 110 pounds underweight, or an average 7 11/16 pounds per child; fifteen pupils between 9 and 10 years were 93 pounds underweight, or an average 6 1/5 pounds per child; sixteen pupils between 10 and 11 years were 165 pounds underweight, or an average 10 1/3 pounds per child; six pupils between 11 and 12 years were 58 pounds underweight, or an average 11¾ pounds per child; twelve pupils of 13 to 14 years were 167 pounds underweight, or an average 14 pounds per child.—Paper read at Buffalo Congress on School Hygiene.

A METHOD OF CLOSING A SINUS BETWEEN THE ANTRUM OF HIGHMORE AND THE MOUTH *

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The topic with which this paper deals has been chosen for three reasons: first, because I have had so much difficulty myself in eradicating these sinuses; second, because I see so many sinuses left after others have operated; and, third, because a search of the literature has failed to furnish very much information regarding the technic of such a procedure. Since selecting the topic I have operated in twenty-three such cases. They were all cases of alveolar necrosis with antrum involvement, with the exception of two cases, or they were cases of permanent sinus following an operation for antrum suppuration secondary to alveolar necrosis. The two exceptions were, first, a large infected dentigerous cyst, lying external to the antrum. This was drained into the nose through the antrum. And, second, a case of composite follicular odontoma which was also drained into the antrum and through it into the nose. With the cases of alveolar necrosis and Highmorian empyema a Denker operation with the complete removal of the necrotic bone was performed.

Various methods for closing these sinuses were tried. Those tried at first gave uniformly bad results. The perfected operation gave about ninety-five per cent. good results. I will describe simply the technic of that part of the operation which was performed after completing the Denker operation, and also the various methods attempted in the order in which they were tried.

First, I removed the necrotic bone and then the inferior portion of the alveolar process. Just enough of the latter was removed to bring the periosteum of its inner and outer surfaces together. The two layers of periosteum were then sutured with interrupted sutures of black Chinese silk, No. 4. These sutures did not hold but tore out within a few days notwithstanding the fact that they were carefully cleansed every two hours with hydrogen peroxid.

Second, the periosteal flaps were prepared the same as before, and, using the same silk, by means of double-armed sutures the threads were introduced from within out, just above the bone. These sutures held better than the first but tore out in two or three days.

It was now manifest that the Chinese silk was not the proper substance for suture material. It would become soaked with saliva, swell, and naturally become crowded with micro-organisms. It was quite impossible to keep these sutures clean.

Third, silk-worm gut was substituted for Chinese silk as in the second method. These sutures could be kept clean and held several days longer than the others, but not long enough to secure healing. The silk-worm gut would cut through the mucous membrane and the periosteum.

Fourth, various substances as gauze, pieces of rubber tube, lead plates, etc., were placed within the loop of silkworm gut, on the inner surface of the alveolar process and a second piece placed underneath the outer ends before they were sutured. This was done with the hope of preventing the sutures from cutting through the membrane and periosteum. The pieces of gauze which

* Read in the Section on Stomatology of the American Medical Association, at the Sixty-Fourth Annual Session, held at Minneapolis, June, 1913.

are so successful in similar sutures on the skin could not be kept clean in the mouth and soon caused trouble. The lead plates were much more difficult to apply than the rubber tubing and had a tendency to cut the membrane. Whole pieces of small rubber tubing or pieces cut longitudinally in halves were used. These sutures would hold nicely for from five to seven days when they would tear out and the sinus would be reestablished but not so large as before.

It was evident that the cause of our trouble was not now due to the suture but to the fact that sufficient bone was not removed to allow apposition of the periosteum without too much tension on the suture.

Fifth, the method which I consider the very best was used. It is the one that we have used in the last half of our operations and while it has not been successful in every case, it has given us 95 per cent. good results. The method is as follows: After completing the Denker operation and being sure that there is excellent drainage into the nose, the alveolar process is attacked. After removing the necrotic bone completely, enough of the inner and outer lamella of the alveolar process is removed to allow of perfect apposition of the flaps that have been previously lifted from its inner and outer surface. These flaps must come nicely together so that it is not necessary to have any tension on the sutures. Then I place along the inner and outer surfaces of the alveolar process at this point a piece of small rubber tube sufficiently long to allow it to be tucked underneath all the sutures; then using double-armed silkworm-gut sutures, a sufficient number are introduced from within out, the loops resting on the rubber tube on the inner surface of the alveolar process, the knots being tied on the rubber tube on the outer surface of the alveolar process. Care should be exercised to tie the sutures just tight enough without getting them so tight as to produce pressure-necrosis of the flap. These sutures are cleansed hourly with hydrogen peroxid following the operation. The nurse must be exceedingly careful to clean in and around the sutures and tube thoroughly. If this operation is done at the time of the antrum operation the incision for the Denker operation is made high up and is entirely separate from the incision on the border of the alveolar process. The periosteum, from the outer surface, is elevated completely without being torn and handled with great care while the necrotic bone is being removed and the inner and outer lamellæ of the alveolar process are being cut down.

With every case of necrosis the operator must exercise his individuality in making the cut on the border of the alveolar process so as to get the best possible apposition of periosteum. The results of this operation have been surprisingly gratifying to me. As a rule the wound margin remains clean, the sutures remain clean, and when they are removed on from the seventh to the tenth day leave behind a well-healed wound. When I attacked this problem last summer I did not expect such gratifying results. It is an operation that I can recommend for trial.

ABSTRACT OF DISCUSSION

DR. THOMAS L. GILMER, Chicago: I should like to ask Dr. Dean if the operation he described for curettement of the maxilla is not similar to the Caldwell-Luc operation.

DR. DEAN: The Denker operation differs from the Caldwell-Luc in that the incision is on the anterior wall of the bone. It is practically the same operation.

DR. TRUMAN W. BROPHY, Chicago: I congratulate the author on his success in closing the sinus, but in my experience the greatest difficulty is in keeping it open. Most surgeons find it difficult to keep it open until the cavity is in a healthy condition. When I succeed in doing this, I always feel that I am fortunate.

The question of sutures within the mouth has been to me one of the great problems. In my earlier experience I had the same results with silk that Dr. Dean has had; I therefore abandoned long ago the use of anything in the mouth that would absorb the secretions, using only silver and horsehair sutures and lead splints. I have had trouble in finding horsehair that could be relied on for sufficient strength for this purpose. It may be kept in the mouth a month, if necessary, without causing any irritation.

DR. G. V. I. BROWN, Milwaukee, Wis.: Some time ago I was operating where they had the most satisfactory horsehair that I had ever used. The hospital authorities took the hair out of the tail of the ambulance horse and boiled it. Prepared in this way it is soft and pliable and not brittle. Sometimes, however, I have found it treacherous. We never have had any infection from it in the hospital, where it has been used a long time.

DR. C. H. OAKMAN, Detroit: In antral cases in which the palatal bone is necrotic I seldom find it necessary to divide the soft tissue overlying the hard palate, but rather cut high above the teeth or amputate the roots of the molars or bicuspids, making a wound sufficiently large through which to remove the necrotic bone. Within the last eight months I have successfully treated four or five cases in which a portion of the palatal bone was necrotic in this manner. In chronic cases, in which the adjacent sinuses are liable to be involved, I fit a vulcanite plug into the wound. This is held in place by the cheek and affords the necessary drainage. In this way the topography of the palate is little affected, which I believe to be of the utmost importance.

DR. TRUMAN W. BROPHY, Chicago: About three years ago I found that the hair of the tail of a bull is much softer, larger and stronger and will endure a great deal more tension than horsehair. It sustains 25 per cent. more weight than horsehair.

DR. L. W. DEAN, Iowa City, Iowa: I appreciate the discussion regarding the kind of horsehair which should be used. I did not mention the use of horsehair in my paper. It was tried, but its quality was so poor that it gave no satisfaction.

THE SURGERY OF INFANTILE PARALYSIS *

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CHICAGO

During the early days after an attack of acute anterior poliomyelitis there is usually little to be done except to make the patient as comfortable as possible. Pain is often so severe that massage and electricity cannot be used, and the only important detail of the treatment is the careful prevention of deformity.

This paper will deal only with the treatment of paralysis of the legs and the trunk, as paralysis of the arms is much less frequent, and would require too much additional time to consider.

The most common deformity following infantile paralysis is the dropping downward of the foot at the ankle-joint, pes equinus. In some cases this is not due to a permanent paralysis of the anterior tibial muscle and the toe extensors, but to the fact that in many instances the attending physician takes no measures to hold the foot at a right-angle during the first few months after the attack. As a general thing the patient is confined to the bed for some weeks or months, and the

* Read in the Section on Orthopedic Surgery of the American Medical Association, at the Sixty-Fourth Annual Session, held at Minneapolis, June, 1913.